Lixu Jin

PhD in Atmospheric Chemistry | University of Montana | 32 Campus Dr, Missoula, MT 59812
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Research interests

Wildfire smoke; Air quality and public health; VOC emissions and chemistry; Ozone photochemistry; Chemical mechanism development; Machine learning; Data-driven analysis;

Education

Ph.D. Chemistry, University of Montana, 2025
B.S. (Honors) Meteorology/Atmospheric sciences, Lanzhou University, 2019

Skills

- *Programming: Python | MATLAB | IDL | R | Fortran 90 | Unix shell | NCL*
- *Modeling: 3D chemical transport (GEOS-Chem); 0D box (F0AM); Trajectories (HYSPLIT);*
- *Machine learning: preprocessing, feature engineering, cross-validation*
- *Analytical: PTR-ToF-MS; TOGA*

Other skills

- Science: data visualization | statistical analysis
- Interpersonal communication: writing | public speaking | teamwork | project management | version control

Research experiences

Rutgers University, New Brunswick, NJ
Postdoctoral Researcher with Xiaomeng Jin: 2026 – Present

University of Montana, Missoula, MT
Teaching and Graduate Research Assistant with Lu Hu: 2019 – 2025

- Developed the interface between 3D GEOS-Chem CTM and 0D F0AM box model.
- Led model simulations (i.e., GEOS-Chem and F0AM with multiple mechanisms) for air quality within wildfire targeted observational constraints.
- Developed a wildfire-targeted 3D GEOS-Chem CTM, provided organic carbon emission budgets, assessed air quality and induced human health implications.

University of Washington, Seattle, WA
Visiting student at Dan Jaffe's group, 2018

- Developed and designed F0AM to simulate traffic emissions at Boise, ID

Lanzhou University, Lanzhou, China
Undergraduate Research Assistant with Jiankai Zhang/Jiali Luo: 2016-2019

- Designed data analysis experiments and investigated the interaction between tropopause folds and extreme weather in China using physical and statistical analysis.

Honors and awards

- Graduate Doctoral Fellowship ($1,000), University of Montana, 2024
- Cicerone Visiting Fellowship ($3,500), NCAR ACOM, 2024
- Bertha Morton Scholarship ($3,000), University of Montana, 2024
- Fred Shafizadeh Memorial Scholarship ($3,200), University of Montana, 2022 and 2023
- Stewart Scholarship ($1,000), University of Montana, 2019
- Chemistry Scholarship Award ($1,000), University of Montana, 2019, 2024
- Outstanding Graduate Award, Lanzhou University, 2019
- Excellent Student Scholarship (¥3,000), Lanzhou University, 2016, 2018, 2019

Professional activity and outreach

- Journal reviewer: *Atmos. Environ* (2021, 2024), *ACS Earth and Space Chemistry* (2023), *Atmos. Chem. Phys* (2023, 2024), *Environ. Sci. & Tech* (2024), *Environ. Sci. & Tech. Lett* (2023, 2024), and *Journal of Advances in Modeling Earth Systems* (2024, 2025)
- Teaching Assistant / Laboratory Instructor: Led and taught lab sections for CHEM 142 and CHEM 144, University of Montana, 2021 and 2024 Fall, ~120 students in total, workload: 15 hours/week

Publication
In preparation
1. **L. Jin,** M. M. Coggon, W. Permar, J. Orlando, R. J. Yokelson, and L Hu: Global chemical impacts of furanoids: 3-D model analysis and constraints from in-situ observations, in prep

Under review
2. **Jin, L.,** Tan, L., Ketcherside, D. T., Selimovic, V., Nauman, K., Yokelson, R. J., and Hu, L.: Characterizing emissions, chemistry, and health impacts of aged wildfire smoke in a western US city, EGUsphere [preprint], https://doi.org/10.5194/egusphere-2026-114, 2026.
   Take-home info: Using long-term ground data, we diagnosed model emission/chemistry gaps, and evaluated smoke-driven health risks in the northwestern US.

Accepted
3. **L. Jin**, M. M. Coggon, W. Permar, J. F. Juncosa Calahorrano, B. Palm, G. I. Gkatzelis, M. A. Robinson, I. Bourgeois, S. R. Hall, J. Peischl, K. Ullmann, J. A. Thornton, C. Warneke, F. Flocke, E. V. Fischer, R. J. Yokelson, L. Hu: Ozone Photochemistry in Fresh Biomass Burning Smoke Over the United States, accepted by *Sci. Adv.*
   Take-home info: We show how fire emissions control OH–ozone–PAN chemistry in fresh smoke, and pinpoint missing pathways in GEOS-Chem whose inclusion would to improve ozone predictions in fire-impacted regions.

First-author
4. **Jin, L.,** Permar, W., Selimovic, V., Ketcherside, D., Yokelson, R. J., Hornbrook, R. S., Apel, E. C., Ku, I.-T., Collett Jr., J. L., Sullivan, A. P., Jaffe, D. A., Pierce, J. R., Fried, A., Coggon, M. M., Gkatzelis, G. I., Warneke, C., Fischer, E. V., and Hu, L.: Constraining emissions of volatile organic compounds from western US wildfires with WE-CAN and FIREX-AQ airborne observations, *Atmos. Chem. Phys.*, 23, 5969–5991, https://doi.org/10.5194/acp-23-5969-2023, 2023. (**Highlighted by NOAA Climate Program Office and Climate.gov**)
   Take-home info: Widely used inventories underestimate wildfire VOC emissions by >3×, implying that fires are a dominant primary VOC source in the western U.S.

Co-author
5. Cope, E.M., Ketcherside, D.T., **Jin, L**., Tan, L., Mansfield, M., Jones, C., Lyman, S., Jaffe, D. and Hu, L., 2024. Sources of atmospheric volatile organic compounds during the salt lake regional smoke, ozone and aerosol study (SAMOZA) 2022. *Journal of Geophysical Research: Atmospheres*, 129(17), p.e2024JD041640. https://doi.org/10.1029/2024JD041640, 2024
   Take-home info: Ground-based measurements show that, in Salt Lake City, biogenic, traffic, and personal-care sources dominate VOCs, and that cutting VOC is key to reducing ozone.
6. Jaffe, D., M. Ninneman, L. Nguyen, H. Lee, L. Hu, D. Ketcherside, **L. Jin**, E. Cope, S. Lyman, C. Jones, T. O'Neil, and M. Mansfield, Key Results from the Salt Lake regional Smoke, Ozone and Aerosol Study (SAMOZA), *Journal of the Air & Waste Management Association* (2024): 1-18. https://doi.org/10.1080/10962247.2024.2301956, 2024
   Take-home info: In Utah's Northern Wasatch Front, wildfire smoke boosts $PM_{2.5}$, ozone, and VOCs, and meeting ozone standards will require large VOC cuts and treating some smoke days as exceptional events.
7. Permar W., **L. Jin**, Q. Peng, K. O'Dell, E. Lill, V. Selimovic, R. J. Yokelson, R. S. Hornbrook, A. J. Hills, E. C. Apel, I-T. Ku, Y. Zhou, B. C. Sive, A. P. Sullivan, J. L. Collett Jr., B. B. Palm, J. A. Thornton, F. Flocke, E. V. Fischer, L. Hu, Atmospheric OH reactivity in the western United States determined from comprehensive gas-phase measurements during WE-CAN, *Environ. sci.: Atmos*, https://doi.org/10.1039/D2EA00063F, 2023. (**"Wildfire impacts on atmospheric composition – Topic Highlight" collection**)
   Take-home info: VOCs dominate OH reactivity in wildfire smoke, yet about half of this VOC sink is missing from current models, with key gaps in furans, butadienes, and monoterpenes.
8. Permar, P., C. Wielgasz, **L. Jin**, X. Chen, M. M. Coggon, L. A. Garofalo, G. I. Gkatzelis, D. Ketcherside, D. B. Millet, B. B. Palm, Q. Peng, M. A. Robinson, J. A. Thornton, R. J. Yokelson, P. Veres, C. Warneke, E. V. Fischer, L. Hu, Assessing formic and acetic acid emissions and chemistry in western U.S. wildfire smoke: implications for atmospheric modeling, *Environ. sci.: Atmos*, https://doi.org/10.1039/D3EA00098B, 2023 (**Highlighted by NOAA Climate Program Office**)
   Take-home info: We show rapid formic acid formation in western U.S. smoke and that models such as GEOS-Chem underestimate formic and acetic acids by >4×, pointing to major missing secondary and biogenic sources.

PRESENTATIONS

<u>Invited talk</u>
1. NW-AIRQUEST meeting, Laboratory for Atmospheric Research, Pullman, Washington, "Current model cannot capture the ", August 2025 (online)
2. Rutgers University, RAQL lab, New Brunswick, NJ: "Constraining the emissions, chemistry, and health impacts of western U.S. smoke", August 2025 (online)
3. NCAR ACOM TropChem meeting, Boulder, CO: "Improving fire VOC representations of emissions and chemistry in air quality models", July 2024 (in person)
4. Westlake University, ACCESS Lab, Hangzhou, ZJ, China: "Constraining fire emission and chemistry in 3D and 0D atmospheric models", May 2023 (in person)

<u>Conferences</u>
- "Characterizing Emissions, Chemistry, and Health Impacts of Aged Biomass Burning Smoke in Wildland Urban Interface: A Missoula, Montana Case Study", AGU Fall Meeting, Dec. 2025 (poster)
- "Global emissions and chemistry of furanoids: 3-D model analysis and constraints from in-situ observations", AGU Fall Meeting, Dec. 2024 (oral)
- "Evaluating Ozone Photochemistry in Biomass Burning Plumes: Insights from Aircraft Campaign Data", AGU Fall Meeting, Dec. 2024 (poster)
- "Global chemical impacts of furanoids: model analysis and constraints from in-situ observations", IGC11, June 2024 (talk)
- "Underestimated Fire Emissions in Inventories: Evidence from Model Simulations and Aircraft Observations", EPA EIC, Sept. 2023 (talk)
- "Improving Biomass Burning Representation of Volatile Organic Compounds (VOCs) in GEOS-Chem", AGU Fall Meeting, Dec. 2022 (poster)
- "Constraining VOC emissions from western US wildfires with WE-CAN and FIREX-AQ airborne observations", IGC10, June 2022 (talk)